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SEX DIFFERENCES IN THE CARDIAC RHYTHMS OF STUTTERERS

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AND

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This paper represents no attempt to determine in toto the causation of stuttering, but offers certain laboratory evidence which must be taken into consideration in further etiological research.

It has long been accepted that the male sex outnumbers the female sex in stuttering from 2 to 1, to 10 to 1.[1-2-3-4-5-6] Differences are expressed in regard to the exact ratio in the literature, but all agree that males outnumber females and that an increase in the ratio takes place as the stutterers approach and pass puberty.

Previous investigations have also been made of the cardiac rhythms of stutterers and normals, both during silence and speech.[7-8] This study confirms the previous studies in that in general the heart beat of the stutterer is faster and more irregular than that of the normal speaker.

It seems logical to presume that elements of difference exist between the normal and the stutterer when neither are speaking, since the act of stuttering attests a neuro-physiological condition of the individual who stutters, which sets him apart from the normal. The literature contains much evidence to this effect.

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[1]Fletcher, J. M. The Problem of Stuttering. Longmans, Green and Co. 1928. pp. 57-58.

[2]Louttit, C. M. and Halls, E. C. Survey of Speech Defects Among Public School Children of Indiana. Jour. Sp. Disorders, September, 1936.

[3]Parker, H. T. Defects of Speech in School Children. Melbourne University Press, 1932. p. 31.

[4]Travis, L. E. Speech Pathology. D. Appleton and Co., 1931. p. 97.

[5]West, Robert. The Phenomenology of Stuttering. Tech. Papers. Am. Speech Corr. Assn., 1930.

[5]West, Robert. Disorders of Speech and Voice. College Typing Co., 1933. p. 93.

[7]Fletcher. Ibid., pp. 194-196.

[8]Travis, L. E., Tuttle, W. W., and Cowan, Donald W. A Study of the Heart Rate During Stuttering. Jour. Sp. Disorders, March, 1936.

TABLE I

	Heart Rate	Diff.	Diff. / S. D. Diff.
All Stutterers	88		
All Normals	79	9	34.75

TABLE II

	Heart Rate	Diff.	Diff. / S. D. Diff.
Stutterers 9–12	90		
Normals 9–12	91	1	2.90
♂ Stutterers 9–12	91		
♂ Normals 9–12	94	3	6.98
♀ Stutterers 9–12	87		
♀ Normals 9–12	84	3	5.61
♂ Stutterers 9–12	91		
♀ Normals 9–12	84	7	14.31
♀ Stutterers 9–12	87		
Normals 9–12	91	4	8.68
♂ Stutterers 9–12	91		
Normals 9–12	91	0	0.00
Stutterers 9–12	90		
♀ Normals 9–12	84	6	13.67
♀ Stutterers 9–12	87		
♂ Normals 9–12	94	7	14.52
♂ Stutterers 9–12	91		
♀ Stutterers 9–12	87	4	7.62
♂ Normals 9–12	94		
♀ Normals 9–12	84	10	22.62
♀ Stutterers	87		
♂ Normals 9–12	94	7	17.63
♂ Stutterers	90		
♀ Normals 9–12	84	6	14.08
♀ Stutterers	87		
Normals 9–12	91	4	10.78
♂ Stutterers	90		
Normals 9–12	91	1	3.05
All Stutterers	88		
♀ Normals 9–12	84	4	9.83
All Stutterers	88		
♂ Normals 9–12	94	6	17.96

In making routine kymograph examinations of stutterers, it was observed that a noticeable number had regularly recurring changes in the pulse rate, and it was in gathering this data for examination that the present phenomena were noticed. It was decided to set up a controlled experiment for the sex and age differences noted.

The pulse was recorded by means of a Lombard radial pulse apparatus[9] on smoked glazed paper and a Miller kymograph. Thoracic and abdominal movements were also recorded, at the same time, but the data from these curves is not included here. The records were timed by an electro-magnetic timer operated at .20 second.

TABLE III

	Heart Rate	Diff.	Diff. / S. D. Diff.
♂ Stutterers	90		
♂ Normals	79	11	35.03
♀ Stutterers	87		
♀ Normals	80	7	18.18
♂ Stutterers	90		
♀ Normals	80	10	29.07
♀ Stutterers	87		
♂ Normals	79	8	22.34
♂ Stutterers	90		
All Normals	79	11	38.06
♀ Stutterers	87		
All Normals	79	8	23.74
♂ Stutterers	90		
♀ Stutterers	87	3	7.89
♂ Normals	79		
♀ Normals	80	1	3.12

16,325 pulse beats were studied as supplied by 24 stutterers and 28 normals. The age range was 9 to 26. Seven stutterers were female and 17 male. The experiment was controlled by recording normals matched age for age, and sex for sex with the stutterers. The records constituted the first experience in experimental records of this type for most of the stutterers and the normals. With three or four of the stutterers the first records made were not analyzable, due to technical errors in the operation of the kymograph. Three of the older normal controls had been

[9]Lewis, Thomas (Sir). The Mechanism and Graphic Representation of the Heart Beat. 3d. ed. Paul B. Hoeber, 1925, p. 23. He remarks that the interval between one upstroke and another gives a quite exact measurement of the duration of the cardiac cycle when measured by this type of apparatus.

used in a previous cardiac experiment.[10] Their records were balanced by the inclusion of two additional normal controls of the same age without laboratory experience. No instructions were given the subjects except those incidental to the attaching of the apparatus, since instruction in the use of this type of apparatus is not necessary.

TABLE IV (a)

		Heart Rate	Diff.	Diff. / S. D. Diff.
A.	♀ Normals 18–26	77		
	♀ Normals 9–12	84	7	14.70
B.	♂ Normals 18–26	72		
	♂ Normals 9–12	94	22	55.84
C.	♂ Stutterers 18–26	78		
	♂ Stutterers 9–12	91	13	23.90
D.	♀ Stutterers 18–26	86		
	♀ Stutterers 9–12	87	1	1.72
E.	Stutterers 18–26	80		
	Stutterers 9–12	90	10	24.15
F.	Normals 18–26	74		
	Normals 9–12	91	17	54.14

The stutterers' records were run as a part of a routine examination, and it was explained to them that no speech was to be asked of them during the record. The normals were informed that an experiment was being performed which required them only to sit and allow the record to be taken. Both sets of subjects were seated so that the movement of the styli was not visible to them.

TABLE IV (b)

		Diff. of Diff.	Diff. of Diff. / S. D. D. of D.
G.	Group A—Group B	15	24.27
H.	Group C—Group D	12	15.06
	Group G—Group H	3	2.97
I.	Group B—Group C	9	13.39
J.	Group A—Group D	6	7.97
	Group I—Group J	3	2.97
	Group E—Group F	7	13.46

The usual technics for analyzing kymograph records were followed, insuring accuracy in these records to the second decimal.[11]

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[10]Palmer, Martin F. The Cardiac Cycle as a Physiological Determinant of Energy Distributions in Speech. Speech Monographs, Vol. IV, 1937. Nat. Assn. Teachers of Speech. p. 113.

[11]Lombard, Warren P. Laboratory Work in Physiology. 3d. ed. Geo. Wahr, Ann Arbor. 1920. pp. 276–284.

Significant differences were immediately recognized between the results for age level, sex, normals, and stutterers, not only in the mean pulse rates, but in the standard deviations. No result was accepted as significant below a **t** of **3.00.**

It is important to note that this experiment is an investigation of both stutterers and normals during silence, conducted for the most part in an isolated, sound-proofed room without windows.

TABLE V

	Heart Rate	Diff.	Diff. / S. D. Diff.
Stutterers 18–26	80		
Normals 18–26	74	6	15.42
♂ Stutterers 18–26	78		
♂ Normals 18–26	72	6	11.65
♀ Stutterers 18–26	86		
♀ Normals 18–26	77	9	16.98
♂ Stutterers 18–26	78		
♀ Stutterers 18–26	86	8	13.33
♂ Normals 18–26	72		
♀ Normals 18–26	77	5	11.57

The only person present besides the subject was the operator. Although the sound-proofing permitted some small seepage of hall noise, the experiment can be said to have been run under fairly constant conditions of stimuli. Both sets knew no speech was expected. It is true that both sets of subjects realized the experiment had "something to do with speech," and that the historical

TABLE VI

	Heart Rate	Diff.	Diff. / S. D. Diff.
Stutterers 15–17	97		
Normals 15–17	71	26	64.52

basis of approach to the experiment was not quite the same for both types. If the differences shown in the results can be traced to this condition, the conclusion must still be that normals differ from stutterers in the manner cited later.

Both groups were run at approximately the same time after meals, about two hours, so that the increase in pulse rate from the digestive process can not affect these results.

Pulse Rate

The investigations previously made are confirmed for the general average rates. (Table I.) However, the breakdown of the data for age and sex shows many interesting deviations from this general picture.

1. *Sex Differences.*—In this investigation, all of the female normals had significantly higher pulse rates than all of the male normals. In stuttering, at the younger age levels, this condition

TABLE VII

	Standard Deviation	Diff.	Diff. / S. D. Diff.
All Stutterers	17.76		
All Normals	15.04	2.72	14.86

is reversed, male stutterers having significantly faster rates than female stutterers. At the age 18–26 (Table V) the normal sex relationship is observed, but much exaggerated. However, the general average for all age groups shows the male stuttering heart to beat more rapidly than the female stuttering heart. The conclusion seems inescapable that the mechanisms involved in stuttering in the two sexes are not the same from the standpoint of metabolism.

TABLE VIII

	Standard Deviation	Diff.	Diff. / S. D. Diff.
♂ Stutterers	18.57		
♂ Normals	15.96	2.61	11.81
♀ Stutterers	11.99		
♀ Normals	12.20	0.21	0.77
♀ Stutterers	11.99		
All Normals	15.04	3.05	12.87

2. *Sex and Age Differences.*—Although in general, when either sex stutters, the pulse rate is increased over the normal control, this is not true for the males at the ages 9–12. This age group involves the time in the distribution of stuttering when the male index of stuttering increases in relation to the female index. Normal males at this time have faster rates than stuttering males, but stuttering males have faster rates than females either stuttering or normal. Also normal males at this age have faster rates than all other combinations of sex and age groups in the experiment. Remembering that stuttering among the males increases at this time, the following conclusions seem acceptable:

(a) Pre-puberal males are non-resistant to stuttering.

(b) An increase of heart rate is not the sole cause of stuttering in the male sex, but is part of the effect of a sex-linked mechanism causing the stuttering.

(c) Pre-puberal males are pre-disposed to stuttering and increased pulse rates.

(d) Increased pulse rates are a sign of non-resistance to stuttering in both sexes, although this conclusion is rendered somewhat doubtful by the fact that there is a change in the relationship in early adulthood. (Table V.)

The comparison of both stutterers and normals of the lower age group (9–12) to the upper age group (18–26) yields further interesting

TABLE IX

	Standard Deviation	Diff.	Diff. / S. D. Diff.
♂ Stutterers	18.57		
♀ Stutterers	11.99	6.58	24.55
♂ Normals	15.96		
♀ Normals	12.20	3.76	16.64
Stutterers 18–26	16.40		
Normals 18–26	12.16	4.24	15.42
♂ Stutterers 18–26	17.44		
♀ Stutterers 18–26	12.96	4.48	10.57
♂ Normals 18–26	11.82		
♀ Normals 18–26	12.01	0.18	0.59
Stutterers 15–17	17.62		
Normals 15–17	11.97	5.65	19.82

information. (Tables II, IV.) The commonly accepted conclusion that the pulse rates for both sexes decrease as they grow older is confirmed. In this investigation, the rate of decrease for the female sex was significantly less than that for the male sex. (Table IVb.) However, when either sex is stuttering, the heart rate does not decrease to the same extent as in normal speakers. The question now arises as to whether stuttering makes a difference in the sex index of decrease. The result of this comparison (Group G vs. Group H; Group I vs. Group J) is 2.97, .03 from a safe assumption of certainty. Fortunately, there is another way of comparing the groups to get a significant answer. When male stutterers 18–26 are compared to male normals 9–12, it is seen that the decreased rate is significant. When female stutterers 18–26 are compared to female normals 9–12 the increase in rate is significant. The difference between these two groups is significant, and it is seen that the sex differentiation is the determining factor in the change of rate. Thus, the mechanism of stuttering does not operate in the same way between the sexes as they grow older, in so far as pulse rate changes

are concerned. Evidently, the mechanism for the causation of stuttering in the female is more closely sex-linked to the pulse rate accelerators than in the male, since in the male the rate tends to decrease, while in the female it tends to stay constant, or slightly faster.

In general, in regard to pulse rates in this investigation, the emotional theory of the causation of stuttering must either be discarded in favor of a neuro-physiologico-metabolic picture, or it must be shown in further experiments that emotional pressures will show similar differences between the sexes. In any case, the inevitable conclusion is reached that a metabolic mechanism is involved between the sexes in regard to pulse rate and stuttering.

TABLE X

	Standard Deviation	Diff.	Diff. / S. D. Diff.
Stutterers 9–12	11.60		
Normals 9–12	12.86	1.26	5.16
♂ Stutterers 9–12	11.99		
♂ Normals 9–12	12.56	0.57	1.88
♀ Stutterers 9–12	10.71		
♀ Normals 9–12	11.32	0.61	1.61
♀ Stutterers 9–12	10.71		
♂ Normals 9–12	12.56	1.85	5.42
♀ Stutterers 9–12	10.71		
Normals 9–12	12.86	2.15	6.62
♂ Stutterers 9–12	11.99		
Normals 9–12	12.86	0.87	3.03
♂ Stutterers 9–12	11.99		
♀ Stutterers 9–12	10.71	1.28	3.45
♂ Normals 9–12	12.56		
♀ Normals 9–12	11.32	1.24	3.96

Standard Deviation.

The regularity at which the heart beats is best expressed in the standard deviation. The results reported by Travis et al. are confirmed for the general average. All stutterers have less regular pulse rates than all normals. (Table VII.)

1. *Sex Differences.*—In general, the responsibility for this deviation is found entirely in the male sex. (Tables VIII, IX.) Female stutterers do not have more irregular pulse rates than female normals, and in fact have more regular pulse rates than all normals. Male stutterers have more irregular pulse rates than female stutterers, and male normals have more irregular pulse rates than female normals.

However, the difference in the relationship caused by stuttering is significant. (Table XII.) Thus it is clearly seen that the mechanism of stuttering is not the same in the male as in the female.

TABLE XI

		Standard Deviation	Diff.	Diff. / S. D. Diff.
K.	Stutterers 18–26	16.40		
	Stutterers 9–12	11.60	4.80	16.38
L.	Normals 18–26	12.16		
	Normals 9–12	12.86	0.70	3.15
M.	♂ Stutterers 18–26	17.44		
	♂ Stutterers 9–12	11.99	5.45	14.19
N.	♀ Stutterers 18–26	12.96		
	♀ Stutterers 9–12	10.71	2.25	5.46
O.	♂ Normals 18–26	11.82		
	♂ Normals 9–12	12.56	0.73	2.62
P.	♀ Normals 18–26	12.01		
	♀ Normals 9–12	11.32	0.69	2.05
R.	♂ Stutterers	18.57		
	♂ Normals	15.96	2.61	11.81
S.	♀ Stutterers	11.99		
	♀ Normals	12.20	0.21	0.77

2. *Sex and Age Differences.*—While the above is true for the general picture, certain differences are found at the various age levels. No significant differences exist between male and male, female and female at 9–12, but when all stutterers are opposed to

TABLE XII

		Diff. of Diff. in S. D.	Diff. / S. D. D. of D.
	Group K—Group L	5.50	14.94
T.	Group M—Group N	3.20	5.68
U.	Group O—Group P	1.42	3.25
	Group R—Group S	2.82	8.06
	Group T—Group U	1.78	2.50

all normals at this age level, the normals have a significantly more irregular pulse rate. Again, at the ages 18–26, while no significant difference exists normally between the sexes, male stutterers have significantly more irregular pulse rates than female stutterers, and both male and female stutterers have more irregular pulse rates than their controls. (Tables X, IX.)

The commonly accepted conclusion that the pulse rhythms decrease in irregularity as age increases is confirmed in the normal subjects. However, stutterers' cardiac rhythms increase in irregularity. (Table XI.) This is true for both sexes. The larger increase in irregularity in the male stutterers is significant. Thus the presence of the male sex and stuttering causes a greater increase in irregularity of the pulse rate than does the presence of the female sex and stuttering. It could be assumed that the chronic pressure of emotional imbalance is the cause of the increase in irregularity of the heart beat, if it were not for the fact that this increase is significantly larger in the male. Thus the assumption seems inescapable that while increased irregularity of heart beat is not the cause of stuttering, it is part of a mechanism linked to stuttering and the sex metabolisms. (Table XII.)

General Conclusions

1. The cause of stuttering must be sought in a sex-linked metabolic picture.

2. The mechanisms for the speed of the pulse, and its regularity are not quite the same for age level, stuttering, normal speaking and sex.

3. Neither increased heart rate, nor increased irregularity of heart beat are necessarily direct causes of stuttering, but are part of a direct by-effect of a sex-linked mechanism causing stuttering.

4. A differing mechanism is responsible for stuttering in the two sexes in relation to heart beat.[12–13]

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[12]It will be noted that there are many figures in the tables which, though interesting, are not used in the conclusions.

[13]A portion of this research has been made possible through a grant from the NYA.

EDUCATION ET REEDUCATION DU LANGAGE

(Notes d'un service hospitalier)

Par Suzanne Borel-Maisonny

Je viens exposer ici quelques principes qui découlent d'une expérience de plusieurs années pendant lesquelles nous avons cherché à modifier le langage des enfants amenés à la consultation par leurs parents, parce qu'ils présentaient des troubles de la parole.

J'exposerai d'abord la clinique des faits, puis je montrerai les exercices dont on peut espérer une amélioration, enfin j'indiquerai les résultats qu'on est en droit d'attendre et les limites qu'on ne peut espérer franchir.

Je n'ai l'intention de faire un inventaire complet ni des troubles corrigés, ni des moyens par lesquels nous y parvenons; je veux seulement, en donnant des exemples typiques de nos méthodes, éclairer certains modes de constitution du langage et montrer des aspects caractéristiques de formulation de la pensée chez les arriérés et les retardés.

J'omettrai délibérément certaines catégories—les bègues par exemple—parce que nous nous sommes étendus ailleurs[1] sur les procédés que nous croyons convenable de leur adresser.

I

Materiel Clinique

Nous indiquerons grosso-modo quelles sont les catégories de troubles auxquels nous devons porter remède.

1°—*Les troubles d'articulation.*

2°—*Le begaiement.*

3°—*Les retards sans arriération.*

4°—*Les troubles du langage chez les arriérés.*

5°—*Les aphasies chez l'enfant.*

6°—*Les troubles du langage chez les paralysés.* (Hémiplégiques, tétraplégiques, syndrômes de Little . . . .)

7°—*Les troubles du langage d'origine psychopathique.*

8°—*Les troubles de la parole par insuffisance de perception auditive.*

[1]Ed. Pichon & Suz. Borel-Maisonny. Le Bégaiement. Paris Masson 1937.

De toutes ces catégories, si nous extrayons les bègues, dont nous avons parlé ailleurs, il reste:

A / Les troubles d'articulation.

B / Les retards du langage chez les arriérés,
chez les retardés simples,
chez les caractériels,
chez les insuffisants auditifs,
chez les aphasiques,
chez les paralysés.

II

A: *Les défauts d'articulation et leur correction.*

Quelle qu'en soit la cause, le principe de leur correction reste le même: il faut arriver progressivement à l'obtention des mouvements composants du son à produire, puis les associer synchroniquement. Il est prudent de ne pas prévenir le sujet du résultat vers lequel tendent les mouvements dissociés, pour éviter de sa part la reproduction du mécanisme fautif dont on veut précisément le débarrasser.

Le plus souvent, il est possible d'obtenir des mécanismes normaux (pour la correction des sigmatismes, ou celle des substitutions de consonnes, par exemple) parfois, on ne peut songer qu' à établir un mouvement suppléant comme dans le cas suivant.

Production des consonnes linguales antérieures chez un sujet ayant de la paralysie de la langue.

La pointe de la langue ne peut se relever derrière les dents. Or, les consonnes T, D, L, N, ne sont audibles que si la langue arrive au contact des incisives supérieures ou de la région rétro-alvéolaire, puisque le bruit d'explosion se produit quand la langue se détache de cette région.

C'est un des cas où l'acquisition du mécanisme correct est impossible. Mais, en apprenant au sujet à faire une brève inspiration buccale pendant que les dents sont serrées, on obtient ainsi un déplacement passif de la langue qui vient heurter la région rétro-alvéolaire: quand elle retombe, il se produit un faible bruit d'explosion suffisant pour rendre les consonnes reconnaissables.

On pourrait multiplier les exemples.

Ils montreraient tous que dans la reconstitution d'un mouvement normal comme dans celle d'un mécanisme de suppléance, il faut d'abord annuler les automatismes fautifs, puis créer des associations nouvelles, d'abord conscientes puis inconscientes.

Les procédés pour y parvenir sont extrêment nombreux puisqu'ils varient avec les individus et les catégories de troubles.

Une méthode analogue sera appliquée à la correction des troubles vocaux ou des troubles respiratoires qui sont, eux aussi des erreurs mécanisme des organes de la phonation.

B: *Les retards du langage et leur reeducation.*

Il y a des différences essentielles dans les retards du langage suivant qu'ils se manifestent chez des arriérés ou de gros retardés globaux ou suivant qu'ils apparaissent à titre d'épi-phonomène chez des enfants n'ayant que du retard simple de l'élocution.

Chez ces derniers en effet une intelligence intacte permet l'instauration rapide de moyens d'expression parce que le langage intérieur est déjà riche et la pensée présente. L'articulation elle-même, parfois très imparfaite ou à peine ébauchée, est si vite apprise qu'on se demande comment ils n'en n'ont pas d'eux-mêmes découvert le mécanisme.

Or, chez les arriérés, non seulement les sons du langage sont souvent informes et dans ce cas fort difficiles à corriger, mais l'absence de langage étant liée à l'inexistance des jugements et des raisonnements, ainsi qu'à l'impossibilité d'abstraire, il s'ensuit que pour leur donner un langage, il faut auparavant leur créer un niveau mental qui le rende possible.

Tout autre sera le problème de l'acquisition de la parole chez un enfant aphasique. Ce dernier, généralement atteint à un âge antérieur à l'apparition du langage, non seulement ne parle pas, mais ne comprend pas la parole. Au rebours de l'arriéré, il est intelligent, il a une vie intérieure active, il juge, compare, déduit, raisonne. Mais ses moyens d'expression demeurent limités à une mimique que parfois des sons inarticulés accompagnent. Il faudra donc, pour communiquer avec lui partir de sensations et d'émouvements que l'éducateur saura provoquer en lui et dont la signification sera évidente. On adoptera alors comme moyen d'expression un langage mixte et toute à fait rudimentaire, fait d'un assemblage de sons et de gestes. Peu à peu, on éliminera les gestes pour ne garder que les paroles.

Absolument opposée sera la méthode si l'on s'adresse à des enfants qui sont privés de langage, parce qu'il y a chez eux la volonté bien arrêtée de n'en pas faire usage. Ceux-ci comprennent la parole. Ils n'ont pas besoin comme le demi-sourd ou l'aphasique de regarder attentivement l'interlocuteur pour deviner à son expression ce qu'il désire; ils comprennent et entendent ce qui leur plait et ignorent le reste; leur passivité lorsque ils reçoivent un ordre qu'ils n'ont point envie d'exécuter est telle qu'on les pourrait croire atteints de surdité. Mais, si l'on vient à faire, en leur présence, quelque commentaire sur leur comportement, on surprend leur regard qui se dérobe aussitôt: ils étaient aux écoutes.

De toute évidence, rééduquer ces sujets, consiste à les redresser psychiquement, ou même plus simplement . . . à les dresser Aucun progrès intellectuel, aucune éducation du langage ne sera possible, tant que ne sera pas accomplie au préalable une transformation de leur caractère.

Enfin, c'est de façon encore différente qu'il conviendra d'aborder les enfants inattentifs aux sons et à la parole, mais non point rétifs comme les précédents. Leur inadaptation à cette forme de la vie de

société que constitue le langage, n'est pas le fait de l'hostilité ou du parti-pris, mais plutôt d'un ennui profond et d'une grande difficulté à se l'assimiler auditivement.

Aussi faut-il leur rendre la parole perceptible avant de leur en demander la réalization.

Donc, chaque forme du retard du langage nécessitera une méthode d'éducation qui lui soit adaptée et des procédés différents. C'est pourquoi nous avons dû multiplier les exercices et nous devons souvent en composer de nouveaux pour un seul sujet afin qu'ils lui soient complètement adaptés.

Nous groupons ces exercices sous les rubriques suivantes:

1°—exercices relatifs à la compréhension du langage.
2°—exercices relatifs à la réalisation du langage.
3°—exercices verbaux gestuels et de langage rythmé.
4°—exercices psychiques d'attention et de volition. Modification du caractère.
5°—exercices auditifs et musicaux.
6°—gymnastique rythmique et exercices moteurs généraux.
7°—exercices pré-scolaires.

Exemples d'exercices relatifs a la comprehension du langage.

Cinq "nouveaux" sont assis sur un banc: Marcel, 8 ans, Mongolien très atteint; Thérèse, 5 ans, gros retard global et troubles du caractère; Yvette, 7 ans, aphasique; Jenine, 3 ans ½, retard simple; Jackie, 6 ans, syndrôme de Little: il peut se tenir debout et commence à marcher seul.

Il y a tout à leur apprendre . . . . ils ne parlent pas, ils ne savent le sens que de quelques mots.

Je dis à chacun d'eux: lève-toi, viens voir.

Marcel répète sans comprendre. Jackie tend la main pour qu'on l'aide à se lever. Yvette ne comprendra qu'après avoir vu qu' à ces paroles correspond l'acte de se lever et de se déplacer. Janine se cache sous le banc. Quand à Thérèse, elle semble n'avoir même pas entendu.

Ils vont pénétrer le sens de mots et de petites phrases élémentaires par des jeux. L'acquisition des notions spatiales "dans," "entre," "dessus," "dessous," etc., se fera, par exemple, avec une poupée et une corbeille à papier. La poupée sera dans la corbeille, *dans* le théatre, *dans* une boite; il faudra l'aller chercher *dans* l'armoire, *dans* le tiroir, etc.

"Entre" est l'objet de nombreuses mises en scène; il est beaucoup plus malaisé à comprendre, aussi les enfants l'apprennent-ils de bien des manières diverses. Ils se mettent *entre* deux d'entre-eux, *entre* une table et une chaise; ils doivent poser un objet *entre* deux autres, etc.

Il faut prendre garde à l'absence de généralisation dans l'esprit des arriérés, retardés ou même aphasiques. Ils ne connaissent que le concret. Tel cet enfant d'un institut de sourdsmuets qui ne reconnaissait pour être un mouchoir que le carré d'étoffe rouge sortant de la poche de son maître.

Nous devons multiplier les conditions de présentation d'un terme avant de la croire acquis.

Des arriérés avaient appris à notre cours de rythmique les termes "à droite," "à gauche," "en bas;" ils ne se trompaient plus même si l'on intervertissait l'ordre des facteurs. Un jour, il nous fallut placer les enfants le dos à la fenêtre alors qu' ils avaient l'habitude d'être de face; 6 sur 8 ne furent plus capables de discerner la droite de la gauche. Ils avaient associé à leur acquis verbo-gestuel une sensation visuelle. Celle-ci variant, ils s'égaraient dans l'ensemble de leurs notions associées. Tel, qui identifie globalement quatre unités sous l'aspect de quatre objets semblables ou même divers ou encore sous l'aspect visuel de quatre bâtons répartis en I + III, ou II + II, ou III + I, disposés *horizontalement*, voit sa notion du "quatre" troublée si les bâtons sont disposés *verticalement*.

S'il s'agit d'un terme générique comme le mot *famille* par exemple, l'acquisition en est naturellement plus complexe encore.

L'enfant groupera en famille des animaux, des poupées . . . .

Il devra être amené à concevoir à propos de tout être vivant la nécessité des éléments "Père, mère, enfant, = famille."

L'idée du singulier et du pluriel et son expression verbale seront acquises de façon analogue.

Des images belles et de grande taille représentant *un* animal et *des* animaux de même espèce et aussi d'espèces différentes, *un* enfant et *des* enfants; *une* personne et *des* personnes de même sexe, puis de sexe différent, sont présentés en pleine lumière et un temps très court sur le théatre, et les enfants doivent dire "un," "des." La réaction parlée doit être immédiate. Une notion n'est utilisable que lorsqu'elle peut être conçue instantanément et employée sans réflexion.

Les notions *animal, chose, personne*, sont apprises de même à partir d'images concrètes graduées pour obliger l'enfant à une généralisation de plus en plus aisée.

En résumé, la compréhension du langage est enseignée par l'association d'images motrices, d'images visuelles et d'images auditives. Cette gymnastique intellectuelle est dirigée attentivement et dosée comme un médicament suivant les réactions du sujet, qui doit toujours être tenu en éveil pendant tout le temps qu'on s'adresse à lui. Les exercices doivent être cessés avant que ne s'installe la fatigue ou l'ennui. Les repos seront brefs, fréquents, mais quand l'enfant travaille, il faut s'imposer une tension d'esprit suffisante pour s'adapter pleinement à lui, si l'on veut qu'il soit lui-même présent et non distrait.

Exercices de realisation du langage.

La plus grande difficulté pour l'enfant qui va parler est de percevoir le rapport entre les sons entendus et l'idée exprimée, ensuite de percevoir les sons eux-mêmes avec assez de netteté pour les reconnaître et pour les reproduire.

Nous entraînons l'enfant à la parole par des réalisations verbales ralenties, exécutées de façon invariable et reproduites jusqu' à l'obses-

sion. On peut obtenir ce résultat en créant des associations mélodico-verbo-gestuelles à propos d'excitations visuelles, auditives, tactiles ou purement motrices. De ces automatismes, nous dissocions ensuite les éléments mélodiques et gestuels, puis les éléments parlés. Ceci est le fondement de la rythmique adaptée à la parole. En voici des exemples: Une mélodie très simple accompagne au piano les mots: à droite, à gauche, en haut, en bas (fig. 1). Les enfants alignés le dos au mur reproduisent les gestes en mesure et sont invités à chanter avec nous "à droite, à gauche, . . . etc." Après quelques séances la simple audition de cette musique au piano déclanche l'automatisme gestuel et parfois une ébauche de parole "awa, ado, ao, aba." Ce n'est que longtemps après cependant que l'enfant établira un lien entre les sons émis, les gestes et le sens attaché à ces termes. Lorsque l'automatisme créé est devenu solide, il est possible d'en dissocier les éléments, puis de changer la mélodie chantée en mélodie parlée, enfin de créer un état de contrôle intellectuel et de résistance à l'automatisme. Par exemple, un élève sera invité à répondre par un geste immédiat aux commandements "à gauche," "en haut," etc. . . . , donnés dans un ordre différent de celui de la mélodie.

Il faut progressivement conduire l'arriéré à l'aptitude aux actes volontaires et réfléchis.

Toute manifestation verbale si minime soit-elle devra être l'objet de félicitations et d'encouragement.

Ceci nous conduit au second procédé pour provoquer la parole: il consiste à utiliser les états émotionnels, à les pousser au paroxysme et jusqu'au déclanchement du langage.

Thérèse ne s'émeut que devant des objets de toilette: apathique et semblant dépourvue de compréhension, elle manifeste une joie intense et un désir de possession évident en présence de colliers, broches, verroteries et simples perles de couleur. Or, ces objets, précisément, nous les lui refuserons tant qu'elle ne consent à rien d'autre qu'à tendre les mains pour prendre ou arracher l'objet de sa convoitise. Non seulement nous les lui refusons, mais nous les donnons devant elle à l'enfant qui a "parlé" en nous efforçant de lui faire comprendre qu'elle les aura dès qu'elle les demandera.

L'exaspération du désir a suffi chez cet enfant pour obtenir d'elle des manifestations verbales où se reconnaissaient l'ébauche des mots: "donne, oh, belle Thérèse." Ce qui est la preuve que dans ce cas, il suffisait d'un état émotionnel reproduit plusieurs fois dans les mêmes conditions pour triompher de l'inhibition qui s'exerçait sur sa parole.

Un troisième procédé qui nous a donné souvent des résultats est celui qui consiste à lier les associations verbales à des excitations inusitées en profitant de l'état d'attention fugitif provoqué par la surprise.

Jeanne-Marie, 4 ans, ne parle pas, ne s'intéresse à rien, paraît cependant entendre, mais il est fort difficile d'apprécier son degré d'arriération.

Nous la conduisons devant notre collection d'instruments de musique. En sa présence, nous frappons sur les cymbales, nous

agitons les grelots, grattons les calebasses méxicaines et faisons entendre un tambour en nommant les instruments. D'abord stupéfaite, l'enfant sitôt accoutumée, a voulu d'elle-même réaliser ces bruits. Au lieu de le lui permettre, nous lui avons imposé de découvrir, puis montrer, l'objet excité derrière elle. Le toucher et l'exciter elle-même, devenait la récompense de l'effort fait pour identifier l'instrument. A ce moment nous avons substitué l'obligation de *nommer* l'instrument à celle de le montrer. A ce prix seulement Jeanne-Marie avait le droit de produire elle-même les sons. Si bien que les premiers mots du vocabulaire de cette enfant furent "*ba* = cymbale, *babou* = tambour, *cra* = le bruit de grattement de la calebasse mexicaine, *ao* = le petit bruit sec du temple-block accroché *en haut* de la table aux instruments."

Exercices auditifs et musicaux.

La réalisation mécanique d'une phrase et même d'un groupement simple de phonèmes suppose l'analyse et le discernement des sons. Les retardés du langage y sont malhabiles. Il faut les éduquer.

Voici comment nous procédons.

Nous avons un grand nombre d'instruments qui sont presque tous des instruments à percussion. Ils ont été choisis pour frapper l'attention visuelle aussi bien que l'attention auditive et peuvent tous être maniés par les enfants. Ils vont des sons très graves (gongs, grosses cymbales) aux sons très aigüs du xylophone, grelots, clochettes, castagnettes, etc., quelques uns comme les calebasses mexicaines, le temple block, le dinner chime, les gros tambours ou même les castagnettes n'ayant jamais été entendus par les sujets, produisent sur eux un effet de surprise certain.

Nous faisons d'abord reconnaître des timbres.

L'enfant doit distinguer des sons très différents les une des autres, par exemple, un grattement sur une calebasse d'un bruit de cloche, une cymbale d'un tambour, le son du temple block d'un bruit de castagnette, puis, des timbres de plus en plus voisins, par exemple ceux du triangle et d'une cloche, ceux de deux sirènes, ceux du temple block et d'un xylophone sans résonateur.

Quand il a acquis une certaine habileté, il doit apprendre à reconnaître des modes de percussion: une cymbale frappée d'un marteau feutré produit un son très différent de celui que provoque un balai ou une tringle métallique.

L'intensité, la manière d'attaquer, la longueur ou la brièveté du son lui seront aussi rendues perceptibles.

On enseigne seulement alors le *nombre* en se bornant évidemment aux quantités que le sujet est capable de discerner visuellement ou dans les exercices rythmiques.

Exercices moteurs generaux.

Chacun sait que la simple activité ludique d'ordre moteur peut suffire à réveiller une classe qui somnole: sauter d'un tabouret, attraper des balles, enjamber des cordes, se sacher, etc., déclanche instantanément une activité psychique incontestable.

C'est donc à titre d'adjuvant ou d'excitant intellectuel que nous pratiquons ces exercices.

Yvette l'aphastique, qui à 8 ans ne pouvait se tenir sur une jambe ni sauter à pieds joints, est parvenue en l'espace de quelques semaines à se balancer sur un cheval à bascule, à sauter d'un tabouret de trois marches, à se diriger sur un tricycle. Dans le même temps son vocabulaire a fait de grands progrès: le "Je" est apparu dans son langage ainsi que des ébauches de conjugaison.

Chez Jackie, le tétrapligique, les progrès moteurs ont toujours précédé les progrès intellectuels à la ligne. On peut sans exagération affirmer que chez l'enfant tout progrès moteur s'accompagne de progrès intellectuel, mais il n'en faudrait pas conclure que ce dernier se traduise inmanquablement dans le langage. Il y a des sujets dont l'intelligence se satisfait par le manîment des objets et leur utilisation.

C'est pourquoi il importe que l'activité motrice elle-même soit rythmée—cadence et nombre étant des éléments inséparables du langage—et soit le plus possible accompagnée de réalisations verbales collectives auxquelles les plus développés entraînent les autres. Les cours de rythmique est toujours aussi un cours de parole en choeur.

Tel enfant de deux ans d'âge riel réalise aisément des tests moteurs de 3 ans et ne traduit son langage intérieur que par des cris inarticulés d'un enfant de moins d'un an.

Inversement tel autre paralysé des quatre membres et qui n'a commencé à parler que vers 7 ans possède maintenant, à 12 ans, en dépit d'une impotence considérable puisqu'il ne peut ni marcher seul ni prendre un objet, un développement psychique très supérieur à la moyenne des enfants de son âge.

Exercices pre-scolaires.—Nos enfants n'ont jamais constitué une classe d'arriérés. Leur disparate, le peu de temps dont nous disposons et surtout notre but nous l'interdisent.

Pourtant nous avons établi une sorte de prééducation scolaire qui permet de garder les enfants à l'âge mental où les classes n'en veulent pas et qui constitue en outre un test excellent.

Resultats obtenus.—Nous considérons les résultats selon qu'ils ont trait à l'acquisition des mécanismes de l'articulation ou à la réalisation du langage.

Il est possible de donner une parole normale dans tous les cas où sa carence est purement fonctionnelle et aussi chaque fois qu'une déficience organique peut être compensée par des mécanismes adjuvants.

L'articulation, la phonation, la respiration pendant la parole sont justiciables de techniques qui tendent à supprimer les automatismes anormaux pour les remplacer par des mécanismes corrects. Les déficiences organiques et les paralysies marquent seules les limites des possibilités.

Pour le langage les résultats sont limités par le niveau intellectuel des sujets. Les récupérations sont extrêmement variables pour la même catégorie de troubles et il y a des degrés dans la qualité du langage obtenu.

Voici quelques exemples des modalités d'expression les plus caractéristiques.

a / *Le langage gestuel avec cris inarticulés.* Beaucoup d'arriérés ne dépasseront pas ce stade.

L'éducation a consisté pour eux à les exciter mentalement de façon suffisante pour qu'ils éprouvent le besoin de manifester leurs sensations et leurs désirs. Ils ont passé du mutisme simple à un language rudimentaire qui leur permet de se faire comprendre Monique G. 13 ans, manifeste sa joie ou son déplaisir par des cris; elle montre les objets qui l'interessent, en comprend l'utilisation, obtient ce qu'elle désire par un symbolisme gestuel auquel l'entourage s'adapte facilement.

b / *Langage-mimique gestuel avec mélodie d'intonation.* Pierre, 8 ans, n'a pas encore de vocabulaire si l'on appele ainsi les signes dont ont coutume de se servir les adultes, mais il a des équivalents. Il accompagne ses discours de gestes véhéments, d'une mimique fort expressive et l'intonation ne fait jamais défaut.

Il nous raconte par exemple: Tch Tch Tch Tch Tch, petit, moselle, papa, maman, Né (= Daniel) boum oh bobo Nel oh bobo nou (il montre son genou) Traduction: dans le train (en prenant le train ou en descendant du train, il est impossible de préciser) avec son papa, sa maman et sa petite demoiselle (le professeur qui s'occupe de lui) Daniel est tombé et s'est fait mal au genou.

Le même encore voyant une girafe s'écrie: KOU Kou Kou Kou Kou = la bête qui a un long cou.

c / *Langage par juxtaposition des termes à exprimer et résidu mimétique important.*

Yvette aphasique s'exprimera de façon plus complexe. Elle raisonne et argumente. Comme elle a coutume de ne me voir qu'à l'hopital, un jour qu'elle vient chez moi, elle y aperçoit une petite fille que je lui dis être mienne et s'appeler Françoise.

"—Françoise, pourquoi chez toi?

—C'est une petite fille.

—Non; moi, les autres, Françoise, pareil.

—Tu as une maman, tous les enfants ont une maman: je suis la maman de Françoise.

—Françoise travaille là?

—Non, elle habite cette maison; c'est sa maison, la maison de Françoise.

—Pas vrai—marcher en bas, puis en haut, puis en bas. Par la fenêtre elle aperçoit la rue (ce qui signifie: Françoise vient de la rue, elle prend une leçon puis s'en va comme moi.) Pas fifille à toi.

—Je t'assure que si.

—Ah (elle réfléchit) puis fait le geste d'incliner sa tête sur ses mains et ajoute: Dodo Françoise, montre."

Je dois la conduire dans la chambre: elle voit le lit de l'enfant et est enfin convaincue.

d / *Langage exprimé en constructions syntaxiques élémentaires.* Enfin, à un degré plus élevé encore, les enfants, au lieu de construire les phrases par simple juxtaposition des substantifs des pronoms et

des verbes à l'infinitif emploient une syntaxe rudimentaire, conjuguent les verbes, utilisent les conjonctions. Mais les constructions de phrases restent simplistes; ils se servent à peine de la subordination, leur langage, d'où le petit nègre n'est jamais complètement banni, est puéril empli de clichés et dépourvu de tout cachet personnel.

e / *Langage normal.* Seuls les retardés simples de l'élocution parviennent à une parole d'où toute anomalie a disparu.

Sauf en cas de retard simple la rééducation est de longue durée; un, deux, trois ans. Elle se borne à activer et parfois à déclancher une évolution qui se serait peut-être faite spontanément mais bien plus lentement et incomplètement. Nous avons la conviction que certaines ne sont arrivées au langage que grâce à l'éducation; tel enfant qui à 12 ans ne parlait pas, disant seulement "maman." et qui à 14, après deux ans de rééducation bavarde avec cris, gestes, mimique, mélodie d'intention, nous paraît ne devoir ce résultat qu'à la gymnastique mentale à laquelle on l'a soumis. Peut-être eut-il abouti à un stade supérieur s'il avait été soumis plus tôt à des exercices appropriés; il serait en tout cas parvenu à son niveau de langage quelques années auparavant et aurait eu le temps de bénéficier intellectuellement des acquis inséparables du maniement de la pensée exprimée.

Nous ne croyons pas cependant qu'il y ait lieu d'imposer aux enfants l'éducation du langage de façon systématique et hâtive. Fixer un âge est impossible. L'âge mental seul compte. Plus encore qu'un test, le comportement habituel de l'enfant renseignera sur l'opportunité de l'intervention. Il ne faut pas oublier que, à moins d'être très anormale, la famille constitue le milieu éducatif par excellence et que, si la mère qui parle continuellement à son enfant n'est pas parvenue à s'en faire comprendre, c'est que celui-ci a bien des chances d'être idiot.

Inversement, il ne faudrait pas accepter sans contrôle les affirmations des parents sur l'intelligence de l'enfant: la fameuse phrase: il ne dit rien mais il comprend tout, est bien sujette à caution. Notamment, il arrive que l'enfant devine les desirs des parents et ceux-ci pensent qu'il comprend leur langage.

Conclusions.—En résumé, les résultats sont variables avec la nature des troubles. Les défauts d'articulation et les troubles de la voix se corrigent aisément à moins qu'ils ne reposent sur un substratum organique.

Quant aux troubles du langage, la correction en est rapide et complète quand ils se présentent dans un syndrôme de retard simple.

Mais l'arriération est une circonstance aggravante. Suivant le degré d'insuffisance mentale, les uns parviennent au langage mixte par signes et ébauches de phrases, les autres ont un langage essentiellement gestuel quoique entremêlé de mots et de phrases automatisés, d'autres enfin ne parviennent qu'à émettre des sortes de phrases mélodico-rythmiques qu'une mimique appropriée rend intelligibles à l'entourage, à moins qu'ils ne restent fixés au stade où l'on peut à peine dire qu'ils ont un langage: l'émission de grognements et de cris différenciés par l'intonation et accompagnés de gestes.

American Speech Correction Association

Membership List
1938

AMERICAN SPEECH CORRECTION ASSOCIATION

The American Speech Correction Association was organized in New York City in December, 1925, at the annual convention of the National Association of Teachers of Speech with which this organization has always been affiliated. Its original name, the American Academy of Speech Correction, was changed to the American Society for the Study of Disorders of Speech in 1927, and the present name was acquired in December, 1934.

The purposes of the American Speech Correction Association as set forth in its Constitution are:

1. To stimulate among educators, physicians, and others of the general public a deeper, more intelligent interest in problems of speech correction.
2. To raise as rapidly as possible existing standards of practice among workers in the field of speech correction.
3. To secure public recognition of the practice of speech correction as an organized *profession*.
4. To furnish this new profession with responsible and authoritative leadership.
5. To make this leadership generally respected by our good works, i. e., by our scholarly research work, publicity work, and administrative skill.
6. To make membership in our organization a coveted recognition of merit and in this way to furnish workers in the field of speech correction with a powerful incentive to greater achievements.

The Association is composed of Associates and Fellows. Any reputable speech correctionist with a college education or its equivalent is eligible for election as an Associate.

A Fellow is usually a pioneer or leader in the field of speech correction who has done eminent research work in speech correction and obtained the doctor's degree.

OFFICERS OF THE ASSOCIATION

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(Not yet named)

LIST OF OFFICERS AND PLACES OF ANNUAL MEETING

Year	*Place of Meeting*	*President*	*Secretary*	*Members of Council**
1925	New York City	West	Stinchfield	
1926	Chicago			
1927	Cincinnati	West	Stinchfield	Travis, Borden
1928	Chicago			
1929	New York City	Kenyon	Stinchfield	Robbins, Busse
1930	Chicago			
1931	Detroit	Kenyon	Robbins	Gifford, Bryngelson Blanton, West Ward, Goldstein
1932	St. Louis			
1933	New York City	Blanton	Robbins	Travis, Bryngelson Hawk, Kenyon Goldstein, Gifford
1934	Chicago			
1935	Chicago	Travis	Robbins	
1936	St. Louis			
1937	Chicago	Goldstein	Robbins	Solomon, Bryngelson Hawk, Blanton Bender, Gifford

*The Council was not created until December, 1930. It includes in addition to the President and Secretary the Vice-President, Treasurer, Editor, the most recent Ex-President, and two other Fellows; these are listed in the order here named.

ALPHABETICAL LIST OF MEMBERS

The following alphabetical list of members of the Association gives the title, degree, professional rank, and address of every person who was a member of the Association on February 1, 1938.

NOTE.—In the following list the names of the Associates are indicated by (A) and the names of Fellows are indicated by (F).

Most of the abbreviations used are standard and self-explanatory. The less obvious ones are as follows: correction—cor., improvement—imp., teacher—T.

Teachers teach in the city where their address is listed unless otherwise noted.

In listing institutions which have granted degrees, all state universities have been designated simply by the abbreviation of the state.

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A STUDY OF AGGRESSIVENESS IN NORMAL AND DEFECTIVE SPEAKING COLLEGE STUDENTS*

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Although aggressiveness is an important trait of personality, little has been done to relate this trait to the college student who is defective in speech. We look upon the aggressive individual as a vigorous, energetic go-getter. Moore and Gilliland[1] describe him as one whose actions are "synonomous with personal force, initiative, assurance. It is thus understood as standing for that trait which in combination with intelligence and reliability goes far toward completing the essential personal requisites for success."

I. Method

In order to study this trait, the revised Moore-Gilliland Test for Aggressiveness[2] was given to seventy-three students enrolled in the Speech Clinic at Purdue University, and to forty-nine students with normal speech. All of the latter group had taken or were taking speech courses. Seventy-one of the defective speaking group were included in this study.[3] Both groups included freshmen, sophomore, junior and senior men and women. The defective speaking group, however, included proportionately more freshmen, and the normal speaking group included proportionately more seniors. The ages of the defective speaking group ranged from fifteen to twenty-five years, with the median age at nineteen. The normal speaking group ranged from seventeen to thirty years, with the median age at twenty. Of the forty-nine normal speakers,

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[1]Moore, H. T. and Gilliland, A. R., "The Measurement of Aggressiveness," *Journal of Applied Psychology*, Vol. V, 1921, p. 97.

[2]The revised Moore-Gilliland Test consisted of five parts: (1) the eye movement distraction test; (2) the staring test; (3) the handwriting test; (4) the word reaction test; (5) the time reaction test. The test is discussed in detail in the *Journal of Applied Psychology*, Vol. X, 1926, pp. 143–150.

[3]Two tests were discarded: one because the subject was not a college student; and the second because the procedure was modified in the administration of the test.

there were four women and forty-five men. In the defective group there were eighteen women and fifty-three men.

The defective speaking group was divided into three sub-groups: articulatory, voice, and rhythm defectives. Any distortion in the formation of the specific speech sounds, or the omission of a sound, or the substitution of one sound for another was classified as an articulatory defect. Any pronounced deviation in pitch, intensity or quality was looked upon as a voice defect. Rhythm defects were any disturbances in the forward moving order of speech. These included stuttering, jerky speech, and unduly rapid or slow speech. Whenever an individual had more than one difficulty, he was classified under that category in which his defect was the more pronounced. Of the seventy-one speech defectives, thirty-seven were defective in articulation, fifteen in voice, and nineteen in rhythm.

All of the coefficients of correlation in this study were derived by means of the Pearson Product-Moment formula, except when the small number of cases indicated the use of the Spearman Rank-Difference formula. In these instances the coefficients were transmuted into the corresponding values of the Pearson coefficients.[4] In this study the reliability of a difference has been expressed in terms of the chances in 100 that the observed difference was a true difference greater than zero.[5]

II. Results

The average score in aggressiveness for the normal speaking group was 70.88. This score was in very close agreement with the results reported by Gilliland.[6] He found that the average of a group of twenty-six salesmen on the Moore-Gilliland Aggressiveness Test was 69.2, and that the average of 315 college students, 185 men and 130 women, was 70.8.

TABLE I

A Comparison of Average Aggressiveness Scores of Normal and Defective Speakers

Group	Number	Average	S. D.
Normal Speakers	49	70.88	±18.58
Defective Speakers	71	64.68	±21.15
Articulatory Defectives	37	63.49	±22.35
Phonic Defectives	15	65.00	±20.15
Rhythmic Defectives	19	66.74	±19.20

The average score for the defective speaking group was 64.68. The difference between the two averages of 6.20 was large enough to guarantee that 96 times in 100 the score of the normal speaking group would be higher than that of the group having speech defects.

[4]Garret, H. E., *Statistics in Psychology and Education*, Table XX, p. 192.

[5]Ibid., Table XIV, p. 134.

[6]Gilliland, A. R., "A Revision of Some Results with the Moore-Gilliland Aggressiveness Test," *Journal of Applied Psychology*, Vol. X, 1926, p. 146.

It is interesting to note that the variability of the defective speaking group was greater than that of the normal speakers. This may have been due to the sampling. The lesser variability in the normal speaking group may have been due to the fact that all the subjects in this group have had some speech training. Perhaps the greater variability in the defective speaking group may be traced to the tendency of many persons who have a defect and are aware of it, either to compensate for that defect, or to tend to withdraw or become more timid because of it.

There were differences found between the two groups which were not brought out by the present method of scoring the test. For example, only eight eye movements enter into the scoring of the test. This section of the test weighs most heavily in the scoring. Moore and Gilliland[7] reported sixteen movements of the eyes as the maximum number observed in their original study. This was the exact maximum number of eye movements observed in the normal speaking group in this study. In the group of speech defectives, however, thirty-eight eye movements were observed as the maximum. Furthermore, fifteen of the seventy-one speech defectives made sixteen or more eye movements. If the ability to stare the observer in the eye is the most reliable of the tests, it would seem that there was some difference in the degree of the measured trait in the individual who made eight eye movements and the individual who made thirty-eight. Yet each number of movements bears the same weight in the present scoring. Perhaps the difference in the average aggressiveness of the two groups is greater than the present method of scoring the test would indicate.

Within the defective group the rhythm defectives were found to be the most aggressive. Their average score was 66.74. The chances that there was a real difference greater than zero between this group and the articulatory defectives, the lowest ranking in aggressiveness, were 72 in 100. Between this group and the normal speaking group the chances were 79 in 100.

The rhythm group was too small to attempt to draw any very definite conclusion, but perhaps one should expect the stutterer (all in this group were stutterers) who was in college to be more aggressive than the ordinary speech defective. The average stutterer has a difficulty which is more vital to him and more noticeable to the layman, than the individual who has an articulatory defect of average severity. The handicap of the average stutterer would seem to be a handicap greater than that of the other average speech defective. Perhaps we have only the more aggressive stutterers attending college.

That aggressiveness is not a static trait was demonstrated by Sister Mary Aquinas McLaughlin[8] when, over a period of from five

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[7]Op. cit., p. 100.

[8]McLaughlin, Sister Mary Aquinas, *The Genesis and Constancy of Ascendance and Submission as Personality Traits*, University of Iowa Studies in Education, Vol. VI, 1930–32, p. 86.

to seven months, she attempted to modify the ascendance and the recessiveness of twenty-five college students. At the end of this period a comparison of the initial and final ratings showed that twelve of the thirteen submissive subjects showed a change in the desired direction. Modification in the ascendant group was observed in only five of the twelve subjects and in most cases the gains were not significantly large. In this study nineteen suggestions for increasing the aggressiveness of the submissive personality were listed. Seventeen of these have been included in the therapeutic technics used with these stutterers. All the stutterers in this group had had a semester of remedial work at the speech clinic, and some had had as many as three or four semesters' work. Particularly have those suggestions which urged the individual to take an active part in social groups and to become an integral part of them been stressed in the therapy which these stutterers have received. Whether or not this training, as co-ordinated with other technics which are directly concerned with the speech pattern of an individual, does modify aggressive behavior can be determined only by comparing the aggressiveness of stutterers before and after they have received remedial speech work. It would seem, however, that the type of therapy which the stutterer had received might tend to do this. It would be interesting to note if there would be an increase of aggressiveness among the articulatory and phonic groups, since the retraining which they had received was different from that of the stutterer, perhaps not so much in type, as in emphasis. All this, however, is speculative, since the sample of stutterers was too small a group from which to draw any definite conclusions, and since the stutterers were not tested before and after they had received speech therapy. A study of the aggressiveness of speech defectives at the initiation and the completion of speech therapy is in progress.

The average aggressiveness of the articulatory group was the lowest within the group of speech defectives. The chances were that 95 in 100 times articulatory defectives as a group would always score lower in aggressiveness than the normal speakers as a group. The large majority of this group of articulatory defectives were functional cases. It is undetermined whether this observed difference in aggressiveness is due to the fact that many functional articulatory defectives may have been trained in unaggressiveness over a period of years, or to the emphasis of the therapy which they have received, or to some other factor.

Within the defective group there was little real difference in the average score on this trait. The greatest observed difference, that between the articulatory and the rhythmic groups, was only forty per cent better than a chance difference.

The maximum grade point average possible at Purdue University is 6.5. The average for the normal speakers was found to be 3.97, and that for the group with speech defects 3.77. The obtained difference in the averages was .20, a difference which signified that the chances were 91 in 100 that there was a real difference in favor

of the normal speakers. The range of averages in the defective speaking group, and in each of the sub-groups was greater than that of the normal speakers.

There was practically no correlation between the aggressiveness and the semester grades of either group. The coefficient for the defective speaking group was .20 ± .05, and for the normal speaking group was .19 ± .06. These correlations agreed with the findings of Gilliland[9] who reports that the correlation between aggressiveness and scholarship standing of fifty-five students at Brown University was .024.

All of the newly entering students are given orientation tests which include tests in English, mathematics, and the Thurstone Psychological examination. The number of persons on which the averages were based varied from test to test, since the test in mathematics was not given to women, and since not all test scores were available for several of the students included in the study. In the computations the raw scores of the subjects were used. The average orientation scores of the groups were not significant, although the English and mathematics scores pointed to a negligible difference in favor of the defective speaking, and the Psychological examination pointed in favor of the normal speaking group.[10]

All the correlations between aggressiveness and the raw scores on the orientation tests were low.[11] All of the coefficients in the defective speaking group, however, were definitely higher than the corresponding coefficients in the normal speaking group. None of the correlations for the normal speaking group were statistically significant. In the group of speech defectives, however, the correlations with English and mathematics scores, although low, were statistically significant, and the correlation with the Psychological scores was three times its own probable error. Although there was little correlation between aggressiveness and scores in the orientation tests, within the defective speaking group, a slight positive correlation did exist.

It was found that speech defectives as a group were less aggressive than normal speakers as a group. However, two questions concerning the defective group itself arose. Is there any relationship between the aggressiveness of a speech defective and the severity of his defect? Is there any relationship between his aggressiveness and his adaptation to therapy? Five clinicians rated all of the

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[9]Op. cit., p. 100.

[10]The average scores for the normal speakers were: English 122.06, Mathematics 37.13, and the Psychological examination 184.40. The averages for the students with speech defects were: English 123.14, Mathematics 38.12, and the Psychological examination 180.36.

[11]The aggressiveness of normal speakers correlated with English .19 ± .07, with Mathematics .11 ± .07, and with the Psychological examination .04 ± .08. The aggressiveness of students defective in speech correlated with English .25 ± .03, with Mathematics .33 ± .08, and with the Psychological examination .30 ± .10.

students with whom they had worked on the severity of their defects, and on their adaptation to therapy. Both ratings were on a five point scale; five represented the most severe and most co-operative. Most of the students were rated by two or three clinicians. The average of the ratings was taken as the severity and co-operative index.

TABLE II

A Comparison of Speech Defectives' Aggressiveness with Severity of Defect and Adaptation to Therapy

Group	Number	Correlation of Aggressiveness vs. Severity of Defect	Correlation of Aggressiveness vs. Adaptation to Therapy
Defective Speakers	71	.01 ± .08	.22 ± .04
Articulatory Defectives	37	.23 ± .05	.10 ± .01
Phonic Defectives	15	—.24 ± .07	.37 ± .15
Rhythmic Defectives	19	—.30 ± .17	.45 ± .12

When the defective group was taken as a whole, the coefficient of correlation was .01 ± .08 indicating no correlation between aggressiveness and severity of defect. The speech defectives as a group are less aggressive than normal speakers but the severe speech defective is not necessarily the most aggressive nor the least aggressive within the defective group. Within the articulatory group, however, there was a low positive and significant correlation which would mean that there was a slight tendency for the more severe articulatory defective to be the more aggressive. Although the correlations for the voice defective and the stutterers were not significant, they tended to point to a negative correlation in these groups; that is to say, that the persons in these groups with more severe defects tended to be less aggressive. The sampling in the rhythm and voice group was too small to justify the drawing of any definite conclusion.

In the group as a whole there was a tendency for the more aggressive individual to be more co-operative in his therapy. Perhaps this tendency may be explained by the possibility that to the aggressive individual a speech defect is a greater difficulty than to the recessive person. Because of this, perhaps, the aggressive individual is more co-operative than the unaggressive one in his remedial work. Previously we stated the premise that the average stutterer has a defect which to him is a more severe handicap than that of the average speech defective. If this is true, when the number of cases in each category is increased, we would expect much the same type of relationship in the several categories as we have found.

Although the sampling in the sub-groups was small it is interesting to note the tendencies which they display. In the articulatory group the individual with the more severe defect tends to be more aggressive. Likewise the more aggressive case shows a very slight

tendency to be more co-operative in his therapy. In the voice and rhythm groups the more aggressive individual has the lesser defect; and the more aggressive person is more co-operative.

III. Conclusions

From this study we are able to make the following statements:

1. The student at Purdue University who has normal speech and who has had at least one speech course is significantly more aggressive than the student with defective speech who is enrolled in the Speech Clinic.

2. There is no correlation between aggressiveness and scholarship grades. The normal speaking students tend to have a higher grade point average than the student defective in speech.

3. There is no correlation between aggressiveness and the scores on orientation tests in the normal speaking group; but a low positive correlation obtains in the defective speaking group.

4. The speech defective tends to show greater variability in aggressiveness, grade point average, and orientation test scores than the normal speaker.

5. The stutterer tends to be more aggressive than the voice defective, and the voice defective more aggressive than the articulatory defective.

6. The articulatory defective tends to be more aggressive as his defect is more severe; the voice and rhythm defective tends to be less aggressive as his defect is more severe. Speech defectives as a group show no correlation between their aggressiveness and the severity of their defect.

7. As a group the more aggressive speech defective tends to be slightly more co-operative in his therapy. The articulation group shows this tendency to the least and the rhythm to the greatest degree.

REVIEWS

By Charles H. Voelker, M. A.,
Director Dartmouth College Speech Clinic

THE RELATION OF MALOCCLUSION OF THE TEETH TO DEFECTS OF SPEECH. By L. H. Fymbo. Iowa City: *Archives of Speech*, 1: 204–216 (June) 1936.

Eighty-seven per cent of the defective speech cases, 62% of the average speech cases, and 35% of the superior speech cases had malocclusion. Conditions contributing to the production of defective speech were: the open and close bite, malocclusion, edentulous spaces,

lack of proximal dental contact. Cases of malocclusion showed strikingly more difficulty with dental sounds. A high or low palate operated to produce faulty [s] and [z] sounds because high palate and malocclusion are closely associated. Females are more able to produce good speech in the face of handicap than males. Malocclusion and lower intelligence may be indications of lack of proper development of the organism as a whole.

AN ANALYSIS OF THE SPEECH DIFFICULTIES OF 56 CLEFT PALATE AND HARELIP CASES. By L. H. COBB (Univ. of Iowa Hospital). Iowa City: *Archives of Speech*, 1: 217–230 (June) 1936.

There was a relatively high relationship between sounds causing articulatory difficulty and those not discriminated by test. The group showed least difficulty with [m] and [n] and used them for substitution most frequently. Voiced sounds were more defective than unvoiced ones, except [s]. Defects were found on vowel quality, [w], [m], [j], plosives, ficatives, pitch and intensity variation, and mental ability. All showed hypernasality and 26% presented delayed speech. Bibliography.

THE FACTOR OF ATTENTION IN RELATION TO THE MOMENT OF STUTTERING. By J. R. KNOTT and W. JOHNSON (Univ. of Iowa). *Journal of Genetic Psychology*, 48: 479–480, 1936.

The stronger the attentional set to stuttering, the more inhibited the speech behavior; this is in proportion to the degree the attentional set provokes avoidance reactions.

THE MOMENT OF STUTTERING. By W. JOHNSON and J. R. KNOTT (Univ. of Iowa). *Journal of Genetic Psychology*, 48: 423–429, 1936.

The moment of stuttering may be broken down into four rather separate configurations. These are the neurological, the precipitative psychological, the reactive psychological, and the communicative. Stuttering is the manifestation of conflict between the communicative and one or more of the other three configurations.

SPEECH TRAINING AS A PREVENTIVE OF NEUROSIS. By ROBERT WEST (Univ. of Wisconsin). Ann Arbor: *Quarterly Journal of Speech*, 22: 614–617 (December) 1936.

"Thus fellow teachers of speech, I present this art of ours as a wholesome regimen of training for the hungry personality of our age. Speech is good mental hygiene. It is a prophylaxis against neurosis. It is an amulet, a phylacyter, a charm to protect the wayfarer along the journey of life against the two great dangers of the road we travel, loneliness and boredom "

(*Continued on page 57*)

A COMMON DENOMINATOR IN TWINNING AND STUTTERING

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I. The problem.

In a study of one thousand families reported elsewhere,[1] a greater incidence of twinning was found in families containing stutterers than in families free from stuttering. Moreover, in the "twinning families" stuttering appeared more frequently in the twins than in the single siblings. When measured by Pearson's Chi-square test of probability, both observations possessed high validity.[2]

There is a query which stems logically from these findings: Is the converse true? i. e., Does stuttering appear more frequently in twinning families than in families without record of duplicate births? The answer to this question is the object of the present study.

Through a grant-in-aid from the Wisconsin Research Foundation, and with the co-operation of Dr. Robert West, we have collected considerable data on twinning families. The high mortality rate of twins in early infancy, coupled with the inaccuracy in addresses of the parents, made it inadvisable to secure the names of such families from the county birth records. With the assistance of the superintendent of schools we secured the names of all twins in the school population. This we found to be a more satisfactory approach. Excellent co-operation was secured by a letter to the parents of the twins explaining the purpose of our study and setting the day on which we would call. By personal interview with the parents and the twins, we have collected and tabulated data on 250 duplicate births, 500 children. The questionnaire covered the following salient points: nationality of parents, siblings with dates of birth, history of handedness in direct and collateral lines, history of speech defects in direct and collateral lines, medical history, and family chart showing the siblings in order in the maternal and paternal lines for three generations.

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[1]Berry, Mildred F. Twinning in Stuttering Families. *Human Biology*, 9; No. 3; 329–47. September, 1937.

[2]Fisher, R. A. Statistical Methods for Research Workers, pp. 75–98. Oliver and Boyd, London. 1932.

II. Summary of tabulations.

In this report we will confine our discussion to the number of births, the position of the twins in the family, sinistrality and stuttering. The tables present the data:

TABLE I

GENERAL DATA

	Position in Family			Types of Twins				Sex				
	No. in Family	Sibs Older	Sibs Younger	No. of twin prs.	Frat.	Iden.	?	MM	FF	MF	Triplets
Totals:	1205	518	187	250	164	82	4	86	103	61	12
Mean:	4.82										
Per Cent:		73.5	26.5		65.6	32.8	1.6	34.4	41.2	24.4	

TABLE II

LEFT HANDEDNESS IN TWINS, PARENTS, AND SIBLINGS

	L. H. Twins M	L. H. Twins F	L.H.Sibs	L. H. in Fa.	L. H. in Mo.	Ambilaterality Twins	Ambilaterality Sibs
Totals:	38	20	52	20	21	17	4
% of groups:	7.6	4.0	7.37	8	8.4	3.4	.8

TABLE III

SPEECH DEFECTS IN TWINS, PARENTS, AND SIBLINGS

	Aver. age Onset of Speech in Twins (in mos.)	Retard. in Develop. of Speech				Infantile Perseveration				Stuttering					
		Twin M	Twin F	Sib. M	Sib. F	Twin M	Twin F	Sib. M	Sib. F	Twins M	Twins F	Sibs. M	Sibs. F	Mo.	Fa.
Totals:	21.96	127	4	12	5	83	3	8	5	34	11	16	5	5	8
% of group:		25.4	.8	1.7	.7	17.4	.6	1.84		6.8	2.2	2.3	.7	2	3.2

III. Interpretation of data.

Size of Family.—The average size of a family containing twins in our study is 4.82 persons, in contrast with the mean of 2.3 children set down for families in the United States by Paul Douglas.[3] The birth order indicates that twins appear much more frequently among the younger than among the older members of the family. The United States Bureau of the Census corroborates this statement in

[3]Douglas, Paul. The Living Wage and Family Allowance Systems. *National Conference Social Work*, 53: 305–17. 1926.

reporting that twins are born more frequently to mothers over 35 than under 35.[4] In this study, 73.5% of the single siblings is older than the twins; 26.5% is younger than the twins.

Identical and Fraternal Twinning.—It is always difficult in a survey to determine whether twins are monozygotes or dizygotes. We attempted, in case of doubt, to check with the physician's records. According to the parents' reports, 65.5% of the twins was fraternal, 32.8% identical. From a survey of the United States, Hamlett concludes that identical twins form 33% of the total in whites.[5] Unfortunately, we have a larger number of female twins than male twins, 267 : 233. In the cities we surveyed we saw all twins in the school population. It is possible that the explanation for the difference lies in the common factor of a higher mortality rate among males.

Sinistrality.—In these families representing 1205 children, approximately one child in ten is left handed. For the United States, Jones reported that 4% of the population was natively left handed.[6] There are, then, 2½ times more sinistrals in our twinning families than in the general population. 7.6% of the male twins, 4.0% of the female twins are left handed; 52 single siblings, 7.37%, are left handed. This percentage for sinistrality in twins compares favorably with Lauterbach's study of handedness in twins.[7] The parents were questioned on sinistrality among the relatives in the direct line, but no conclusion can be drawn as yet from the data assembled.

Speech in Twinning Families.—In an earlier study reported in the *Journal of Pediatrics*[8] it was found that the mean age of the onset of speech in the stutterers was 23.54 months, in contrast to the mean age of 16.1 months for the control group; or 15.3 months for Mead's study at Columbia University.[9] The five hundred twins in the study now in progress show a similar retardation in the onset and development of speech. The twins were 6.7 months behind the mean established by Mead. The question of a handicap in the development of speech in twins has been raised by Hirsch of

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[4]United States Department of Commerce, Bureau of the Census; 19th Annual Report. 1933. p. 4.

[5]Hamlett, G. W. D. Human Twinning in the United States: Racial Frequencies, Sex Ratios, and Geographical Variations. *Genetics*, 20 (3): 250–58. 1935.

[6]Quoted by Lauterbach, C. E. The Psychology of Twins. Doctoral dissertation, University of Wisconsin. 1924.

[7]Lauterbach, C. E. Studies in Twin Resemblance. *Genetics*, 10: 538. November, 1925.

[8]Berry, Mildred F. Developmental History of Stuttering Children. *Journal of Pediatrics*, 12; No. 2: 209–17, Feb. 1938.

[9]Mead, C. D. The Relation of General Intelligence to Certain Mental and Physical Traits. Bureau of Publications, Teachers College, Columbia University, New York. 1916.

Harvard[10] and by Dewey of Columbia University[11] but neither has made an extensive study. Our tentative conclusion is that the twin child, like the stuttering child, has a greater chance of beginning life with a defective armamentarium for speech.

In these 250 twinning families there are 66 stutterers, representing 5.5% of the total number of children. Therefore, instead of the normal expectancy of one stutterer in one hundred children,[12] we report 1 in 18 to be a stutterer in our twinning families. If we consider only the twins the ratio is higher: one twin child in 11 is a stutterer. If we consider only the single siblings, 1 in 35 stutters.

The high sex ratio of stuttering in twinning families (between 3 : 1 and 4 : 1) parallels closely the results established by West in the White House Conference Survey.[13] In infantile preservation and in general retardation in the development of speech there appears to be an even greater preponderance of males over females.

Is There a Common Denominator?—Our results indicate that the outcome is the same whether the problem of speech is approached from the angle of twinning or from that of stuttering. There is a greater frequency of left handedness, of retardation in the onset and development of speech, and, in the case of twinning, a greater incidence of stuttering in these families. We are inclined to believe that there *is* some common denominator. A description of this factor, however, is impossible at this stage of our investigation. We offer only a general postulate which we suggested in an earlier study, and which apparently is strengthened by the results of the present study. We quote directly, in part, from the earlier paper on this subject.

The bulk of evidence presented by Newman,[14] Stockard,[15] Hamlett,[16] and Dahlberg[17] and reviewed elsewhere,[18] is in favor of the heritability of twinning. It may be assumed from the studies by

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[10]Hirsch, N. Twins: Heredity and Environment. Harvard University Press, Cambridge, Mass. 1930.

[11]Dewey, Evelyn. Behavior Development in Infants. Columbia University Press, New York. 1935.

[12]West, Robert. Disorders of Speech, Reading and Writing. Practice of Pediatrics. Vol. IV: chapter 14. Brenneman, Joseph, ed. W. F. Prior and Co., Hagerstown, Md. 1937.

[13]West, Robert. ibid.

[14]Newman, H. H. The Physiology of Twinning. University of Chicago Press, Chicago. 1923.

[15]Stockard, C. R. Developmental Rate and Structural Expression: An Experimental Study of Twins. *American Journal of Anatomy*, 28: 115–266. 1921.

[16]Hamlett, G. W. D. Human Twinning in United States. ibid.

[17]Dahlberg, G. Twin Births and Twins from a Hereditary Point of View. Stockholm. 1926.

[18]Berry, Mildred F. The Medical History of Stuttering Children. Doctoral dissertation, University of Wisconsin. 1937.

Quinan,[19] Ramaley,[20] and Merriman[21] that left handedness is inherited. The present research strengthens the theory of the inheritance of stuttering. It would be possible to say that each phenomenon is inherited independently, but this does not seem likely in view of the fact that these factors tend to appear together and to have properties in common. Left handedness and twinning and stuttering tend to occur together. Sinistrality and stuttering both exhibit a high sex ratio. At first glance, one might say that the connection between twinning and stuttering is obvious. The member of the pair who natively should have been left handed has been forced to develop dextrality; as a result of the dual dominance in the cerebral hemispheres there is a conflict for control of the speech organs. The child stutters. This theory is logical. The only difficulty is that it conflicts with the known facts. There are, for example, two pairs of male twins in the family of No. 53. (The younger pair, now 20 months old, has not developed speech.) Both of the older twins stutter, although No. 53 stutters more severely than his brother. Numbers 74 and 75 are recorded as identical twins. No. 74 is left handed in all activities; No. 75 is right handed in writing, sighting, batting a ball, in all activities except eating. Both stutter. Numbers 279 and 280 are recorded as identical twins. Both stutter. The physician who delivered No. 459 noted in the record that the twins were monozygotic. No. 459, who was delivered first, is left handed, stutters. His twin died at birth. No. 165 is a fraternal twin (MF); he is left handed in all activities; he stutters. His twin sister is right handed and developed normal speech at 18 months. When one remembers the pressure of a right handed society, it seems highly improbable that the twins who natively should be right handed are actually left handed. If this evidence is to support the "hemispherical dominance" theory, such an assumption would have to be made. Moreover, it should be noted that the incidence of stuttering among the single siblings in the twinning families is very high. Instead of the norm of 1 in 100, approximately 1 in 35 single siblings stutters. Although these examples do not warrant a generalization, they contra-indicate the assumption that twinning per se produced stuttering, or that left handedness per se produced stuttering.

"The results of this study indicate that twinning and stuttering also tend to appear together, but we have not explained the relationship. Is it possible that the nervous dysfunction which obtains in stuttering is part and parcel of the same factor in the germ plasm responsible for multiple births? If the genetic complex is responsible

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[19]Quinan, Clarence. Sinistrality in Relation to High Blood Pressure and Defects of Speech. *Archives of Internal Medicine*, 27: 255–61. February, 1921.

[20]Ramaley, F. Inheritance of Left-Handedness. *American Naturalist*, 47: 730. 1913.

[21]Merriman, Curtis. The Intellectual Resemblance of Twins. *Psychological Monographs*, 33: no. 3. 1924.

for the retarded axiate growth at a critical moment in the embryo's life, then it may be responsible at the same time for the retardation in the neural patterns necessary for integrated speech. To carry the argument further back, the factor in the germ plasm producing twins may be a gene establishing an abnormal biochemical relationship, favorable to the retardation of a single axiate production, unfavorable to normal speech. One cannot forget the thesis of an atypical metabolism in stutterers, a fact which Kopp clearly illustrated.[22] Mention was made in our earlier study of the experimental production of twins in lower forms by the irradiation of ultra-violet light and of the experimental production of left handedness by a vitamin B depleted diet.[23] Is it possible that the genic force favorable to twinning and to stuttering may show itself in some process connected with vitamin metabolism? It is conceivable that the chemical imbalance might be sufficient to change the permeability of cell membranes and so alter healthy reception and conductivity.

"The theories just expressed may be reiterated for left handedness. Left handedness and twinning may be a part of the same basic phenomenon although they may have no direct effect on each other. Following Lauterbach's reasoning, we may not be too far afield to suggest that many of the left handed stutterers may have lost their mates in utero; they were, in origin, twins. Biologists now are inclined to look upon autolysis of embryos as a common occurrence. If we pursued Newman's line of reasoning we might argue that the interference with fetal circulation which may occur in twinning could affect both of the centers normally dominant in establishing handedness and speech. The brain stands oxygen loss badly. Neural tissue probably would be the first to suffer injury by any interference with normal nutrition.

"Now, what can be said for the high sex ratio in stuttering? Again, we must begin with a genetic background. Since left handedness also exhibits a high sex ratio, we must conclude that the factors responsible for both are present more frequently in males than in females. Those who accept Newman's concept of the physiology of twinning may argue that males make higher metabolic demands in utero and consequently will suffer greater hazards with any atypical condition.[24] Stuttering and left handedness, if they are to be linked with a defective metabolism, logically should appear more frequently in males than in females. The high sex ratio of still births, and the estimated higher ratio of intra-uterine death in the early months of gestation lend support to the thesis of metabolic differences. The final argument leads us back, however, to genic factors. Riddle

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[22]Kopp, George. Metabolic studies of stutterers. *Speech Monographs*, 1: no. 1. September, 1934.

[23]Berry, Mildred F. Twinning in Stuttering Families. *Human Biology*, 9: no. 3: 329–47. September, 1937.

[24]Riddle, Oscar. Factors in the development of sex and secondary sexual characteristics. *Physiological Reviews*, 11; no. 1: 63–106. January, 1931.

places the responsibility for the higher metabolism of the male on the deleterious Y chromosome."[25]

All in all, whatever theory one accepts, the best answer to the question of a common denominator seems to reside in a genic constitution.

IV. Conclusions.

1. In a study of 250 duplicate births representing 500 children, it was found that stuttering occurs more frequently in twinning families than in families in which twins do not occur.

2. In an earlier study of 500 stutterers and 500 non-stutterers it was found that twinning occurs more frequently in stuttering families than in non-stuttering families.

3. Connections previously having been established between left handedness and twinning, and between left handedness and stuttering, a common denominator for twinning, stuttering, and sinistrality is postulated in genic forces.

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[25]Riddle, Oscar. ibid.

REVIEWS

(*Continued from page 50*)

THE USE OF HEARING AIDS. By A. W. G. EWING, I. R. EWING and T. S. LITTLER (Dept. Education of the Deaf, Victoria University of Manchester). Reports of the Committee upon the Physiology of Hearing of the Medical Research Council, IV; London: His Majesty's Stationery Office, pp. 40, 1936, 9d. (Also from The British Library of Information, 270 Madison Ave., New York City.

This research considered the following problems: The relative audibility of pure tones and speech, the intelligibility of amplified speech to deaf and normal listeners, the frequency response of hearing aids of various types, background noise, tests of hearing and hearing aids in the author's clinic, and the use of hearing aids in the treatment of children with defects of hearing.

THE NEW ACOUSTICS. By N. W. MCLACHLAN. London: Oxford University Press, pp. vi and 166, 1936, $2.75.

Here is a book on acoustics written from the engineering point of view. It is profusely illustrated and the apparatus pictured is for the most part of British design. The chapter headings are: *The Old Acoustics, The New Acoustics, The Arrival of Broadcasting, Loud Speaker Equipment, Microphone Developments, Development of Horn Loud Speakers, Loud Speakers for the Home, The Old and New Gram-*

mophones, Talking Pictures or Sound Films, Accurate Measurement of Frequency, Analysis of Sounds, Behavior of the Ear, Deaf Aids, Auditorium Acoustics: Reverberation, Measurement of Sound-Absorption Co-efficients. It is very pleasant reading for experimental phoneticians.

CHILDREN HANDICAPPED BY CEREBRAL PALSY. By E. E. LORD (Harvard Medical School). New York: The Commonwealth Fund, pp. xii and 105, 1937, $1.25.

A considerable share of the progress in handling the birth injured is due to the phoniatrist, who is ever finding cerebral palsy of more importance in speech pathology. This psychological study of Lord represents findings from over 300 cases with follow up word over a nine year period. The book has the following chapters: *Medical Explanation, Psychological Aspects of Muscle Training, The Mental Testing Program, Mental Development in Relation to Educational Plans, The Teacher's Problem, Emotional Problems of Child and Parent.*

THE SPEECH PERSONALITY. By ELWOOD MURRAY (University of Denver). Chicago: J. B. Lippincott Company, pp. xii and 517, 1937.

Murray's work may prove to be one of the most important contributions to educational psychology of the speech field in recent years. It is the second book in the last three years which has been a gratifying and radical departure from traditional fundamental speech course books. Phoniatrists took little interest in beginning speech courses before the Gray and Wise publication believing that this course was really in the province of only a cousin field. But Murray has heeded the advice of Goldstein—that the teacher of normal children can learn much from the teacher of exceptional children, and has given in this book the result of his application of this principle; it is the result of his wide experience in experimental phonetics and phoniatry. It is the expression of the course we are steering in the evolution of our concepts out of the time when we saw only the *trees*, into the future where we may glimpse the *forest.*

THE STUTTERER SPEAKS. By C. F. Wedberg (Director of Speech Correction, Redlands City Schools). Boston: Expression Co., pp. 129, 1937, $1.75.

Wedberg was a severe spasmophemiac, and inspired by a lecture of Gifford, overcame his speech disorder, and altered some of his personality characteristics. Prof. E. R. Nichols saw how badly he stuttered before and how well he speaks now. This is the best description since Johnson's. Wedberg's discussion of his relief, which he incidently advises for sphasmophemiacs in general since it helped him, is clearly written and contains valuable materials. Just as we all bought Johnson, we must all buy Wedberg. The book will have many uses, because of Wedberg's insight and lucid style. His method is excellent. C. H. V.

(*Continued on page 62*)

THE PSYCHOLOGY OF STUTTERING

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There are many current conceptions of stuttering, which term is here used as synonymous with stammering. It is, however, generally agreed that stuttering, which is an intermittent disturbance of the rhythm of speech, is a syndrome built on a foundation which needs to be much better understood.

Most, not all, students of speech disorders are gradually coming to agreement on a general conception of the nature of stuttering. I believe that the following brief remarks represent the general trend of the views voiced by a large proportion of the foremost workers in this field. I refer in particular to the members of the American Speech Correction Association. To these we owe a debt of gratitude and appreciation for their conscientious, sincere, persistent struggle to unmask the complicated and difficult problem of stuttering.

The syndrome of stuttering includes speech, general bodily, and psychological manifestations. The speech manifestations include speech block, speech hesitations, and speech repetitions. The general bodily symptoms include facial contortions and spasms, gestures, breathing disturbances, general signs of bodily tension, both skeletal and visceral, such as rapid heart, sweating and pallor, and even chemical and electrical changes.

The psychological changes in developed stuttering are very important. You can learn most about this from the patient himself, if he is mature enough and has enough self-knowledge and insight to tell you. Fundamentally there is a lack of confidence in speech adequacy in social situations, hence an excessive sense of responsibility or over anxiety for social speaking, with anticipation or expectancy of stuttering during social speaking. Consequently there is emotional excitability for, and fear of, social speaking, with speech doubt and speech uncertainty.

When stuttering does occur, whether as speech block, speech hesitation or speech repetition, there is panic, mental flurry, embarrassment, shame, a state of feeling rattled, and a feeling of being trapped, with defensive efforts to hide, escape, postpone, avoid

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or prevent speech trouble. There is resulting speech hurry, rush and confusion, with the use, often stereotyped, of synonyms, wedgers, circumlocutions and starters, and a tendency to continue and stop speaking at the same time.

Conditioned bugaboo sounds, letters, words, persons and situations develop.

Speech is better when the individual is at ease, well-rested, confident, calm, speaking when alone or in unison, during singing, or when speaking to animals or those much younger. It is worse when reverse conditions exist, especially when speaking over the telephone, before those who are harsh, hurried or in authority, before an audience, or in any social situation which is, for the individual, a greater than ordinary strain for social speaking.

Memory of past unpleasant speaking experiences is largely responsible for fear of recurrence.

His speech disorder becomes for the stutterer his hidden secret in social situations requiring speaking. In such situations he is at once on guard, fearing the outcropping of stuttering, lacking confidence in his speech adequacy, fearing detection of it by others and their reactions thereto, and excitedly planning to prevent, avoid, postpone, hide, escape, and overcome any slightest evidence of its presence. It is his ever-present enemy, ready, in the background, to overwhelm him and throw him into speech panic and his dreaded psychological trap.

As times goes on, personality changes occur, in three main directions. There may be (1) suppression of the personality in increasing degree; (2) overassertion; and (3) sensible acceptance of the presence of stuttering with reasonable attempts to bring about gradual improvement.

Whatever increases nervous and mental tension and excitability, increases the liability to stuttering in the developed stutterer. This includes fatigue from illness or irregular daily routine, especially with insufficient sleep, malnutrition, overwork and an overcrowded daily program, and current personal mental conflicts and frustrations of any nature.

It is generally conceded that the usual onset is in childhood, with its greater excitability and instability, especially during the speech developmental period.

Stuttering is most apt to occur in timid, excitable children.

The immediate exciting causes of onset include over-stimulation from any cause, such as, illness, fatigue, fright, fear, painful emotional experiences leading to insecurity, errors in child management such as ridiculing, threatening, frightening, overharsh discipline, insisting on the child using a vocabulary too difficult for him, forcing a left-handed child to use the right hand, and the like.

There are some controversial problems still unsettled, such as: Is there failure of unilateral cerebral dominance, with resulting

conflict between the cerebral hemispheres, and, if so, is this primary or secondary? The same applies to claims for weak visual imagery or transient auditory amnesia. Is there a basic state of anxiety and a sense of guilt, due to unconscious emotional causes, especially repressed infantile sexuality of various types, including oral eroticism? Is stuttering an unconscious excuse to overcome feelings of inferiority and gain attention, superiority and power over the listener? Are there underlying metabolic conditions responsible for the outcropping of stuttering?

Or may any combination of factors which produce overstimulation and emotional excitability initiate stuttering at the susceptible life period? Personally I am inclined to favor the last view.

From what has already been said we are justified in concluding that stuttering is an emotional and personality speech disorder, showing itself in an anxiety state concerning social speaking, and in social maladjustment of the total individual, as well as in intermittent speech block, hesitation and repetition.

A Syllabus of Lectures on "The Mechanics of Speech and Voice" were delivered by Robert Curry, M. A., Ph. D., and Douglas Guthrie, M. D., F. R. C. S., in the Edinburgh School of Speech-Training and Dramatic Art, 8 Moray Place, Edinburgh, Scotland on Thursdays, at 5:30 P. M., commencing Thursday, January 13, 1938.

The lectures will be illustrated with projections and demonstrations of apparatus. They will include among other items:

Speech and Hearing—Structure and function of Ear. Theories of Hearing. Tests of Hearing in Adult and Child. The Hearing Chart and Aids. Types of Deafness and effects on Speech. Deaf-Education. Visual-Hearing.

The Disorders of Speech—Types. Lack of Speech. Baby Speech. Delayed Speech. Faulty articulation of consonants. Influence of dental defects. Nasal Voice. Effects of Cleft-palate and of Adenoids. Treatment. Exercises.

Stuttering and Stammering—Incidence and age. Psychological factors involved. Effects of faulty breathing, muscle tension, environment, left-handedness, brain dominance. Treatment. Value of rhythm, relaxation, bodily fitness.

The Singing Voice—The Registers, voice quality and compass. Attack, vibrato and "wobble." Voice-range in sexes and the "Break." Disorders, stage-fright and the temperamental artist.

The Management of Speech Clinics—Training of Clinician. Case-selection. Environment. Handling of Adult and Child cases. Case-history and notes. Instruments and methods of diagnosis and research.

REVIEWS

(*Continued from page 58*)

THE PREVENTION AND CORRECTION OF READING DIFFICULTIES. By E. A. BETTS. Evanston: Row, Peterson and Company, pp. 402, 1936, $2.00.

Betts interprets recent research findings concerning dyslexia. He has attempted to cover the entire field: *Points of View on Retardation, The Reading Program, Factors Underlying Reading Difficulties, Relation of Reading to Growth, Analysis of Reading Difficulties, Hand and Eye Preferences, Eye Movements, The Work of the Eyes, The Mechanics of Reading Materials, Hearing, The Vocabulary Burden, Emotional Factors, The Program of Prevention, The Program of Correction, The Reading Clinic, Reappraisal.* There is a list of publishers of materials and tests, a glossary, and index.

THE EFFECT OF TRAINING UPON THE HANDEDNESS PREFERENCE OF THE RAT IN AN EATING ACTIVITY. By R. MILISEN (Indiana University). (in Travis-Studies in Clinical Psychology). Princeton: Psychological Monographs, 49: 234-243, 1937.

I have not the space to fully review this interesting study which concluded that handedness of some but not all rats can be changed by training; that handedness can not be explained solely on the basis of either habit formation or innate tendencies but rather by an interaction between them; that disability of the preferred hand does not seem to influence handedness preference; that the older the animal becomes the more firmly fixed his handedness preference seems to become; and that female rats seem to be more easily shifted in their handedness preference than male rats.

A SPEECH CORRECTION PROGRAM. By C. E. KANTNER (Louisiana State University). Tuskaloosa: *The Southern Speech Bulletin*, 3:5-9 (November) 1937.

Thirty-six per cent of the grammar school pupils in Baton Rouge have defects of speech that need to be corrected in order to secure reasonably acceptable speech. The number of special teachers needed to handle such a group would be prohibitive in cost. Also it is uneconomical of time and energy for a speech correction teacher who is capable of treating cleft-palate speech, paralytic speech, stuttering, etc., to spend his time working on the minor difficulties which are really speech improvement cases. Kantner's program involves (1) the existence of one expert phoniatrist per each 900 square miles located in centers of population, (2) the services of a speech correction teacher for each school, the number of such teachers to be based on pupil population, and (3) the co-operation of each primary and secondary school teacher who should be required to take a semester of phonetics and a semester of speech correction. C. H. V.

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